

# **NASA's and ESA's Tracking Networks A Decade of Strategic Partnership For Solar System Exploration**

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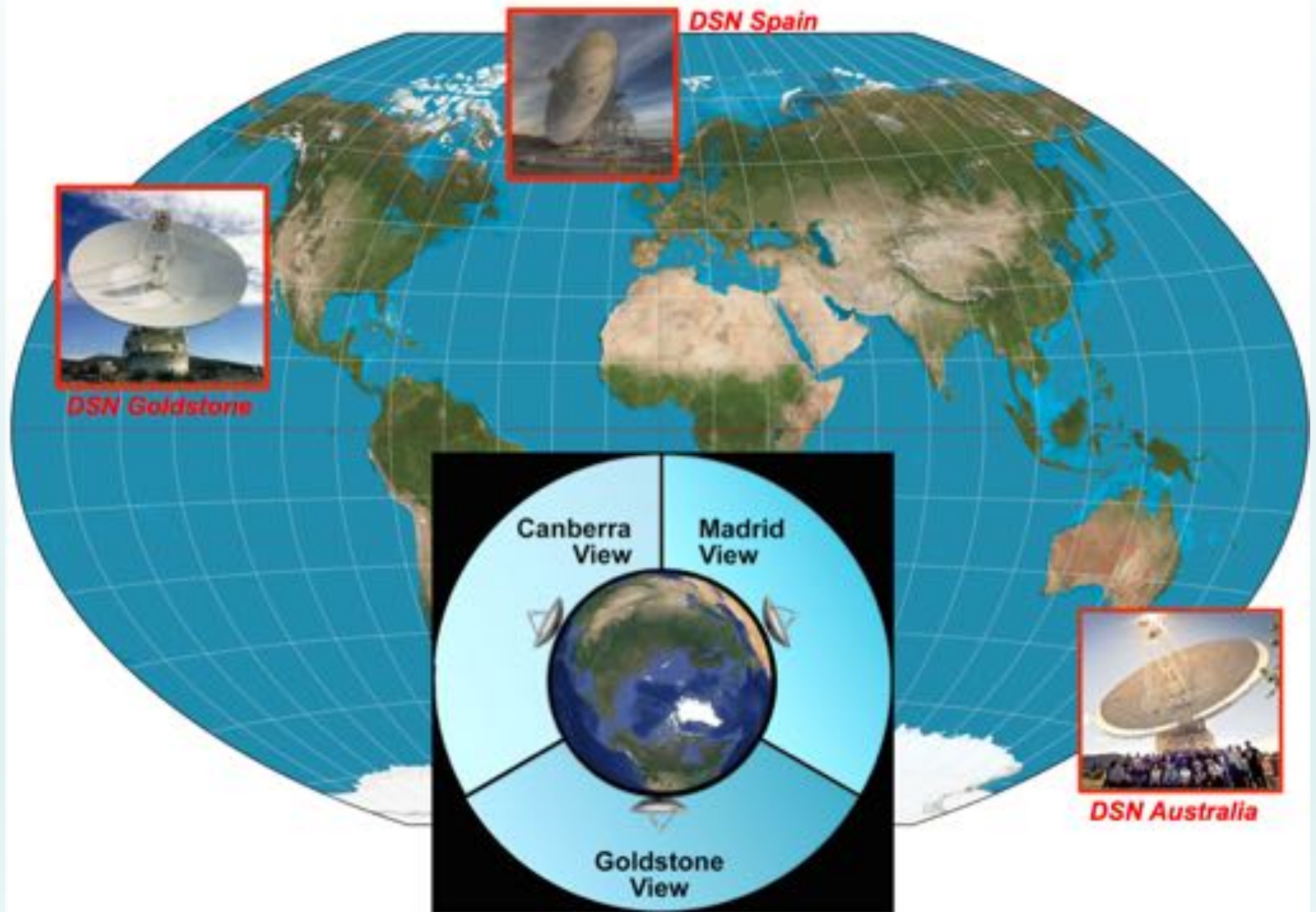
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**Jet Propulsion Laboratory**  
California Institute of Technology

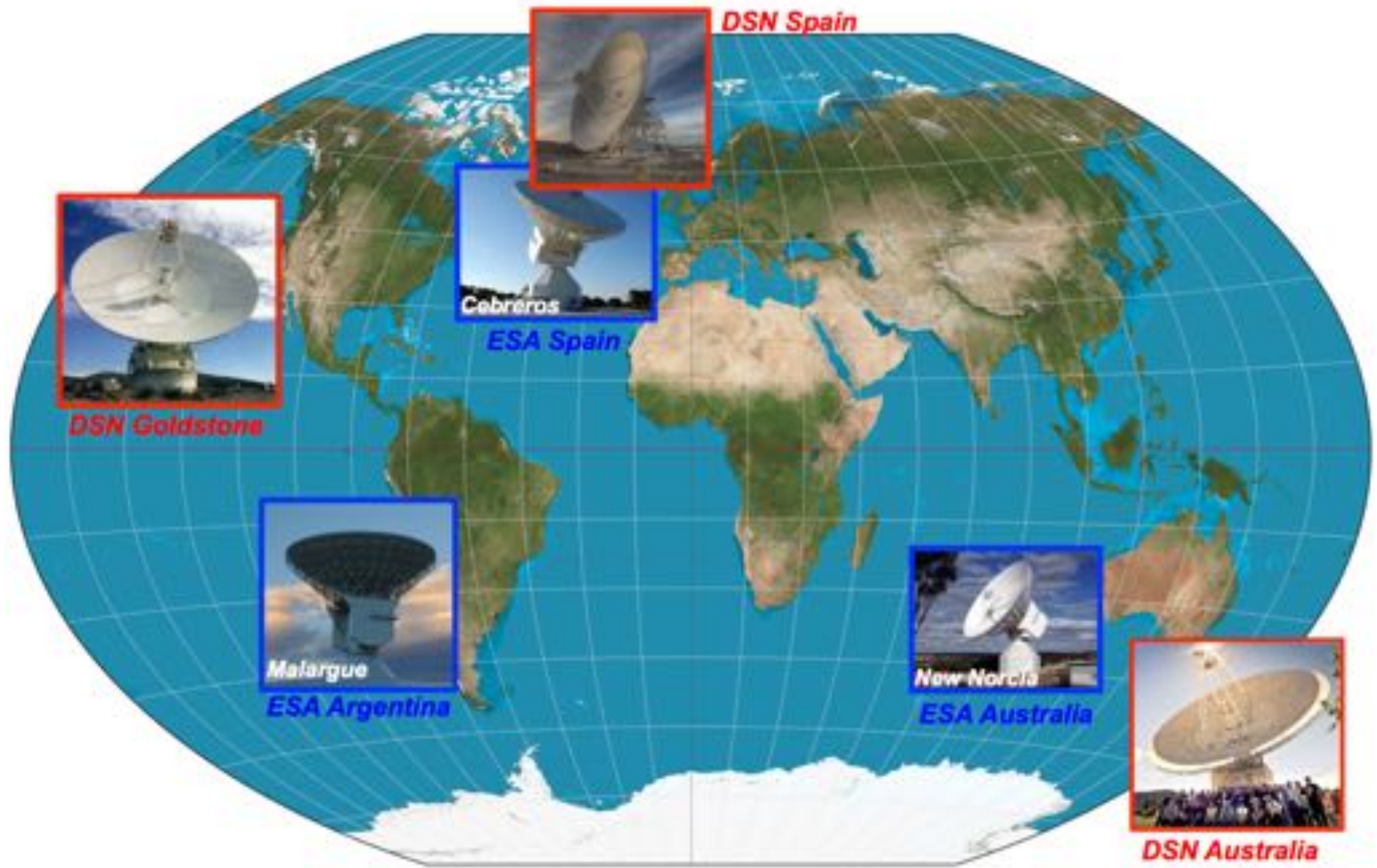
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# In the Beginning

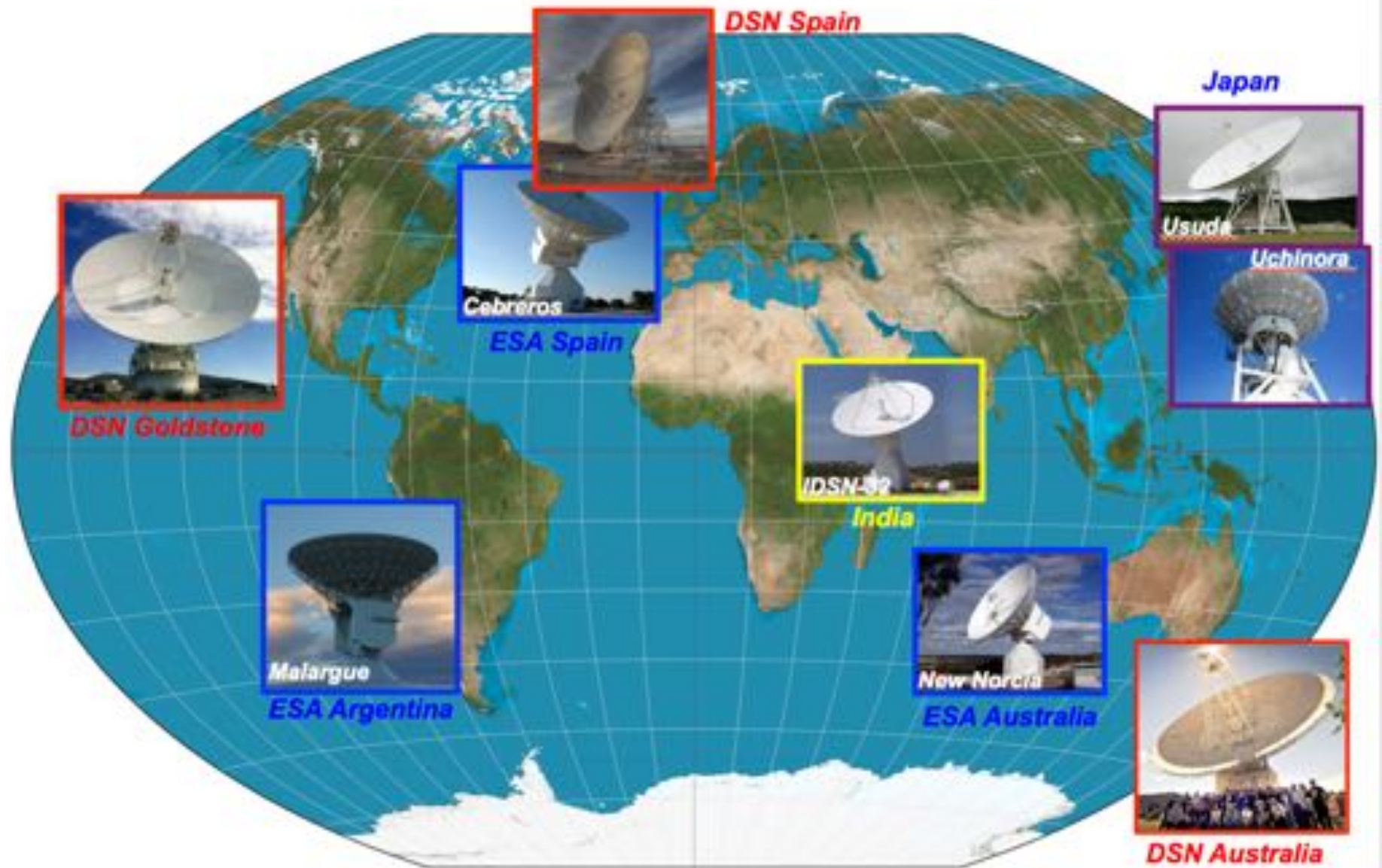




# Then ESA

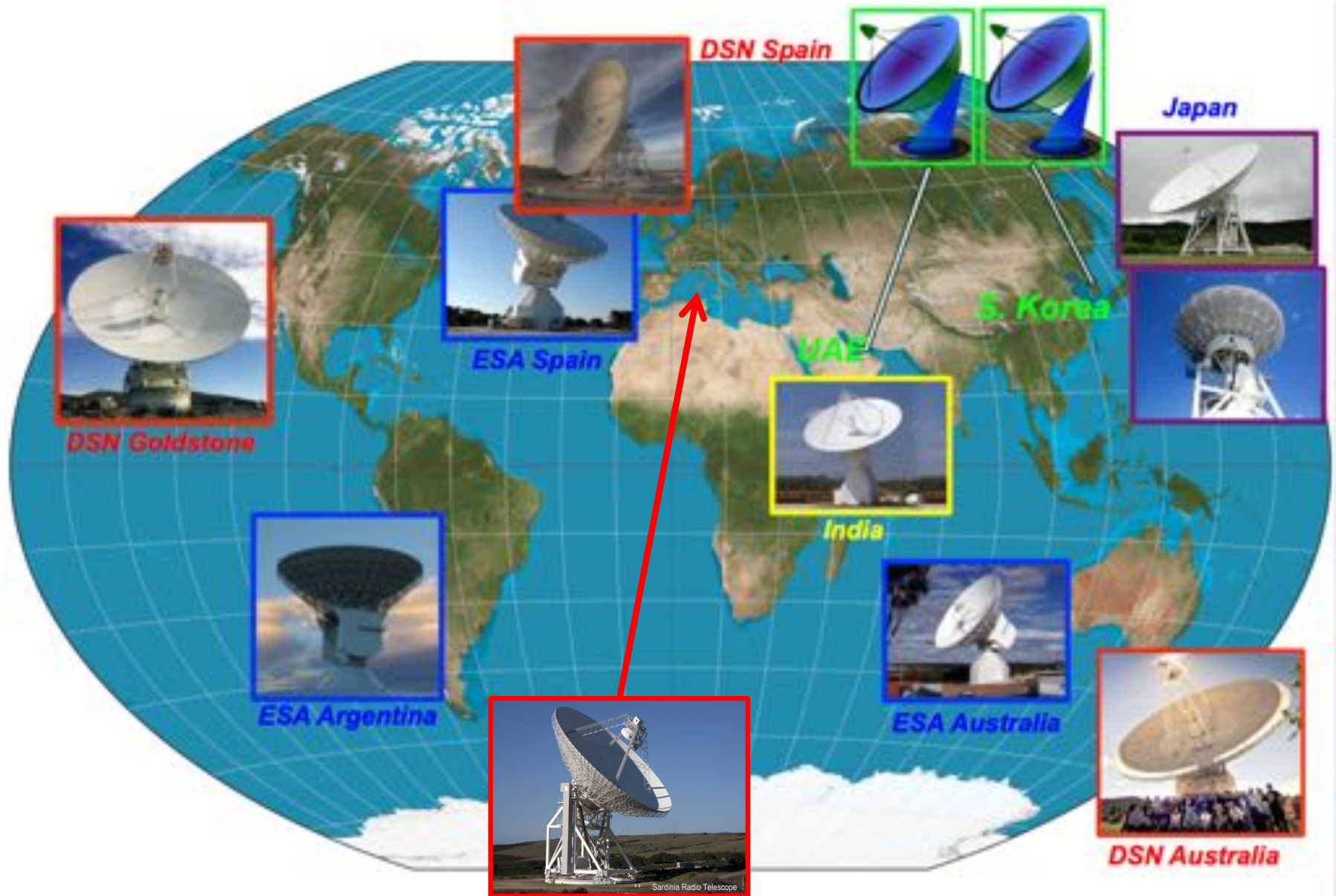


# Japan Then India



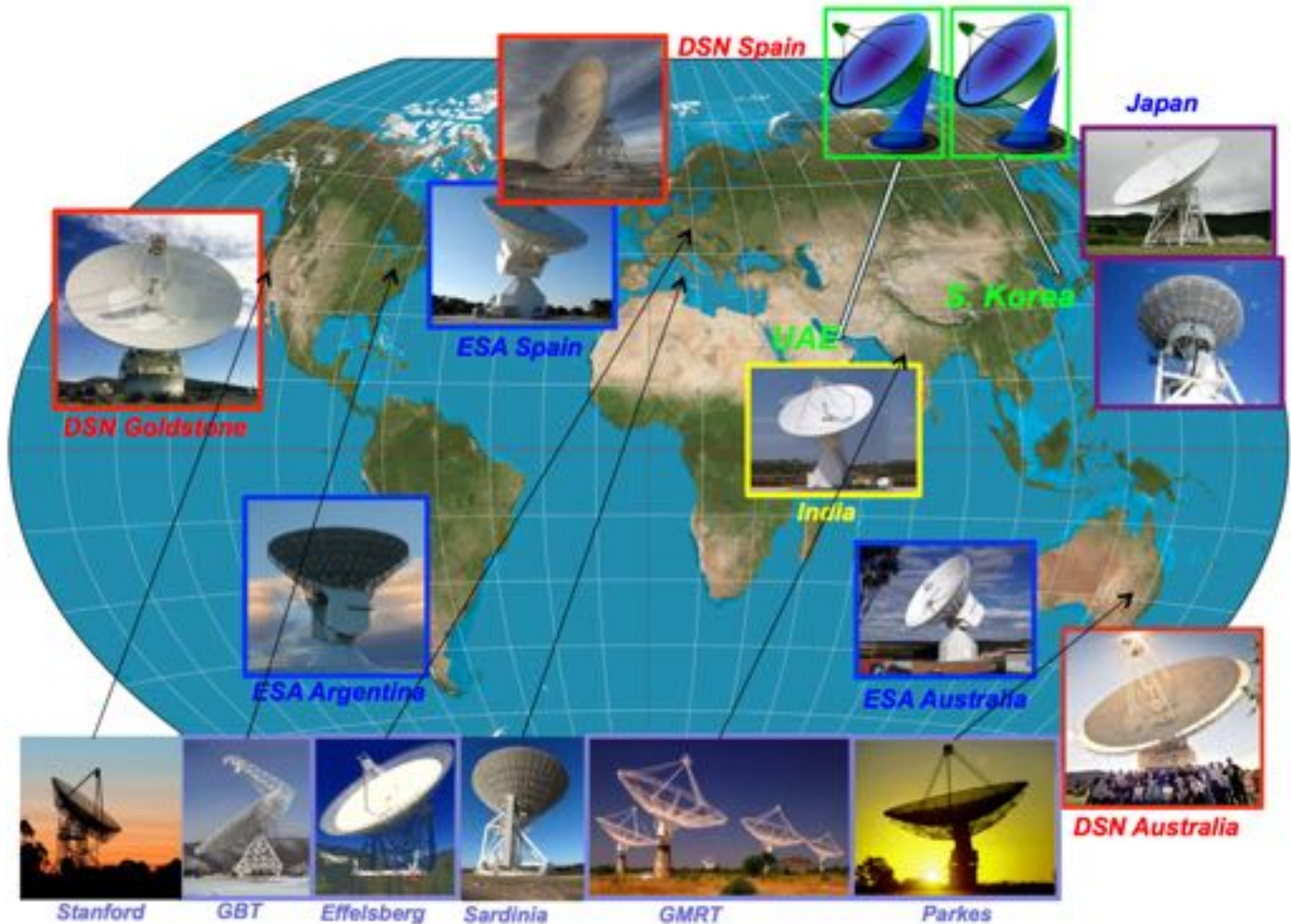


# Other Possibilities



**Italian Space Agency - Sardinia SDSA**

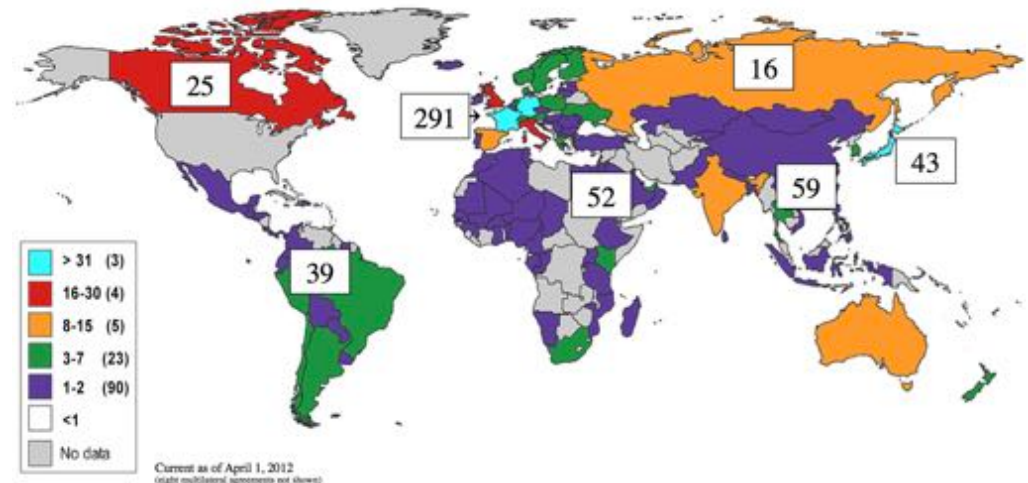
# Use of Radio Telescopes





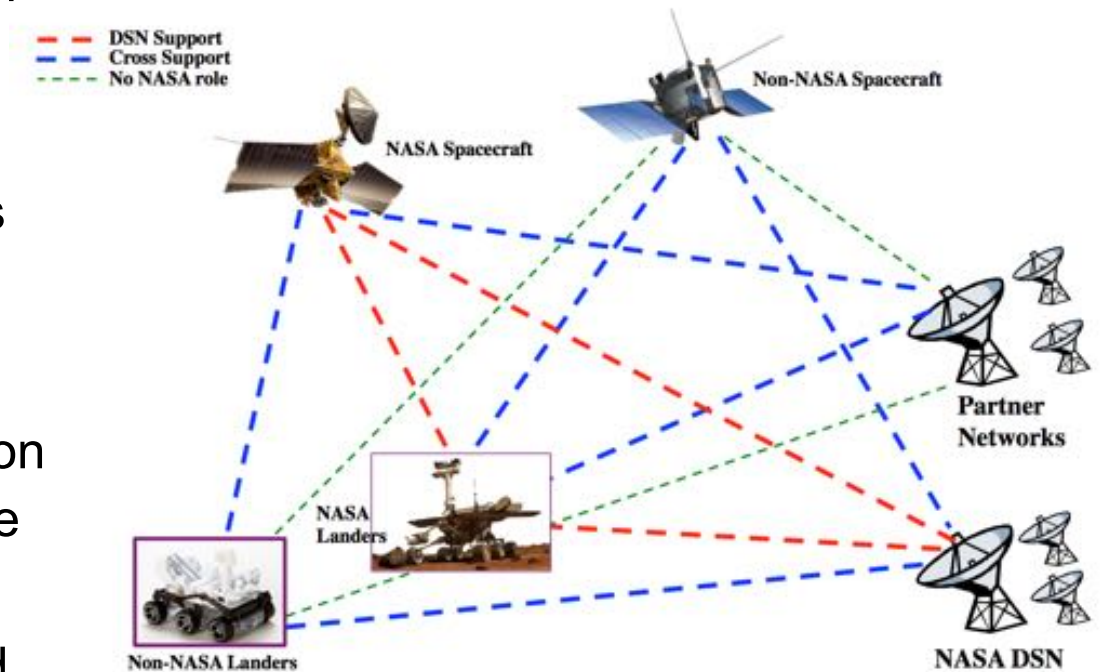
# Strategic Partnership at NASA

- **Directed by the 1958 National Aeronautics and Space Act**
  - NASA will cooperate with other nations & disseminate information broadly
  - 2010 National Space Policy: Expand on mutually beneficial space activities to
    - Broaden and extend the benefits of space
    - Further the peaceful use of space
    - Enhance collection & partnership in sharing of space-derived information
  - Reaching out to non-traditional partners with more limited national resources
- **Current NASA international collaboration**
  - ~600 active international agreements
  - 8 partners account for 50% of agreements (France, Germany, ESA, Japan, UK, Italy, Canada, Russia)
  - 2/3 are in science missions
  - 1/2 are with partners in Europe



# Benefits of Strategic Partnerships

- **Cost Benefits**
  - Meet redundancy requirements for critical events and navigation
  - Agencies utilize existing partner assets to balance their needs
- **Mission Benefits**
  - Quick response to reduce risks
  - Enable or enhance science
- **Collaborative Benefits**
  - Foster international collaboration to benefit agencies and science community
  - Share valuable experience and share in discoveries and excitement





# Flavors of Strategic Partnership

1. **Cross Support** - only NASA-ESA agreement with no exchange of funds
  2. **Stand alone Agreement** – trending – exchange payload or access to science data
  3. **Reimbursable:** e.g., NASA with ISRO & UAE
  4. **Hand Shake:** Radio telescopes!
- **Serve the conditions:**
    - **NASA missions needing support beyond the DSN**  
**ESA missions needing support beyond ESTRACK**
    - **Non-NASA missions, foreign or domestic, needing DSN support**  
**Non-ESA missions needing ESTRACK support**
  - **Organizations:** US or foreign; government, commercial, or non-profit
  - **Government Documentation**
    - **Technical Assistance Agreement, Commerce agreement, Space Act Agreement**

# Benefiting Missions

## Case of NASA-ESA Partnership

### • NASA Missions using ESTRACK:

- Cassini
- Dawn
- Juno
- Curiosity, Opportunity, Spirit, Phoenix
- MAVEN
- SOHO
- STEREO
- VLBI Quasar Catalog
- InSight
- JWST
- Mars 2020
- Europa (inquiry)

### • ESA Missions using DSN:

- Cluster
- Integral
- ExoMars 2016
- Ulysses
- Giotto
- MEX
- VEX
- Rosetta
- XMM
- Gaia
- ExoMars 2020
- BepiColombo
- JUICE



# Goals

- Make strategic partnerships process invisible to mission users
  - One stop shop
- Carry collaboration forward to future technologies to gain same benefits
  - Optical communications, CubeSats, etc.
- Expand CSA scope to other interested agencies (JAXA & ISRO)
  - Reduces complicated negotiations for each mission support